

**RESPONSE UNDER 37 C.F.R. § 1.116**

U.S. Application No. 10/030,247

**Q68006**

**REMARKS**

Claims 1-24 and 27-36 are all the claims pending in the application. Claims 8-24 and 27-35 are withdrawn from consideration by the Examiner. Claims 25 and 26 were previously canceled.

Reconsideration and review of the claims on the merits are respectfully requested.

***Election/Restrictions***

The Examiner acknowledges Applicants' election without traverse of Group I, claims 1-7, 25 and 26. The Examiner withdraws from consideration newly submitted claim 35, drawn to a method of using a porous film, as being directed to a non-elected invention.

***Claim Rejections - 35 USC § 102 and § 103***

Claims 1-3 are rejected under 35 U.S.C. 102(b) as assertedly anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tamura et al (US 4,539,393) substantially as set forth in the previous Office Action.

Claim 4 is rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Tamura et al substantially as set forth in the previous Office Action.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Tamura et al in view of Tsutsumi et al (US 5,571,875) substantially as set forth in the previous Office Action.

Claim 36 is rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Tamura et al in view of JP 59-14494 as evidenced by Kawakami (US 5,888,666) for the reasons given in the Office Action.

**RESPONSE UNDER 37 C.F.R. § 1.116**

U.S. Application No. 10/030,247

**Q68006**

Regarding claim 36, the Examiner recognizes that Tamura is silent as to the use of the porous film as a battery separator of a lithium ion battery. However, the Examiner asserts that JP '494 teaches the use of the porous aramid film as a battery separator of a lithium ion battery (claims 1-4). The Examiner asserts that Kawakami teaches a secondary battery comprising a cathode, an anode and a polymeric film between the cathode and the anode (figure 1). The Examiner concludes that it would have been obvious to one having ordinary skill in the art to employ the porous aramid film of Tamura as a battery separator of a lithium ion battery because such is the intended use of the materials and Kawakami provides the necessary details to practice the invention of Tamura/JP'494.

Regarding Applicants' previous arguments, the Examiner is not persuaded. The Examiner recognizes that Tamura does not specifically disclose the obtained film being porous by adding an inorganic salt to the coagulating bath. However, the Examiner asserts that the film in Tamura would have inherently possessed a porous structure prior to stretching since both Tamura and Applicants assertedly use the inorganic salt in the coagulating bath. It is the Examiner's position that the gas permeability, porosity and cross-sectional pore laminar coefficient would be inherently present.

Applicants respectfully traverse the rejections.

The present invention is patentably distinguishable from the cited references, particularly Tamura et al. Applicants focus on the patentability of the independent claims 1, 2, 3, and 5. The dependent claims each incorporate the subject matter of an independent claim.

Applicants previously indicated that the film of Tamura et al may have a porous structure. However, Applicants have now noticed from the careful review of the description of Tamura et al that the film of Tamura et al has no air permeability. In other words, the film of Tamura et al has no open pores which communicate from one surface to the other surface. The film of Tamura et al is described to be transparent (See Tamura, for example, col. 8, lines 27-31, and Example 1 at col. 15) and, therefore, is believed to be non-porous since a porous film having multiple fine open pores cannot be transparent. Thus, Applicants respectfully submit that the present invention is patentably distinguished from Tamura et al.

Furthermore, the Examiner alleges such that the porous film of the present invention is produced from the same materials and the same process as disclosed by Tamura et al, and, therefore, is the same as the film of Tamura et al. However, the film of Tamura et al is not obtained by the same process as that for the film of the present invention as explained below in detail.

In the examples of Tamura et al, the following processes were adopted (steps after coagulation are omitted in the following explanation):

Dry film formation consisting of dope → cast → drying (at 140°C for 20 minutes) → washing with water (immersion in water) in Examples 1 to 14;

Wet film formation consisting of dope → cast → washing with water (immersion in water) → stretching in 50% NMP bath in Example 15; and

Wet film formation consisting of dope → cast → coagulation (aqueous 43% CaCl<sub>2</sub> + 5% NMP).

On the other hand, in the examples of the present application, the wet film formation process is distinguishable:

Wet film formation consisting of dope → cast → coagulation (NMP/water - 30/70 to 80/20 optionally containing 1 to 20% CaCl<sub>2</sub>).

Several distinctions between the present invention and Tamura et al are described below:

a. In the present invention, the dope with the original composition (a low polymer concentration) is immersed in the coagulation bath, which is different from Examples 1 to 14 of Tamura et al which include a drying step. Examples 1 to 14 of Tamura represent a dry film formation process and it is supposed that the polymer concentration becomes higher at the stage of immersion into the coagulation bath than that in the original dope due to the elimination of the solvent. Thus, the polymer concentration in Tamura is higher than the preferable concentration range described in the present specification at page 8, lines 27-32, since the original polymer concentration of the dope was 20 wt.%.

Further, the coagulation bath in Tamura et al has a composition of 100% water, while that in the present application contains an amide-based solvent at a concentration of 30 to 80 wt.%.

Therefore, the process as described in Examples 1 to 14 of Tamura et al is completely different from that in the present application in the polymer concentration and coagulation bath composition.

b. Example 15 of Tamura et al employs p-phenylenetetraphthalimide containing 59 mol% of the 3,4'-diaminodiphenyl ether unit, which is different from the polymetaphenyleneisophthalamide-based polymer of the present invention. Film formation is

carried out by a wet film formation process as in the present invention, but the coagulation bath consists of 100% water which is different from the NMP/water-based coagulation bath in the present application.

Therefore, the process of Example 15 of Tamura et al is completely different from that in the present application since it employs a different polymer structure and coagulation bath composition.

c. Example 16 of Tamura et al employs a wet film formation process as in the present application, but uses a coagulation bath of aqueous 43%  $\text{CaCl}_2$  and 5% NMP which is greatly different from the NMP/water-based coagulation bath as in the present application.

Although it is described in present specification, page 10, lines 25 - 31, that a metal salt may be added at a concentration of 1 to 10% in order to control the pore size, the coagulation bath in this example contains a metal salt of  $\text{CaCl}_2$  at a very high concentration of 43%. Therefore, this process is also completely different from that in the present application.

Furthermore, it is noted that the Examiner refers to the moisture absorption deformation as described in Tables 1 and 2 of Tamura et al and alleges that it is an alternative measurement of the gas permeability as described in the claims (the previous Office Action, page 3, bottom line through page 4, line 3). However, this is not the case. The value is measured in Tamura et al as an indication of heat resistance and dimensional stability of the materials for electronic parts (column 9, lines 29-54), but Tamura et al is completely silent concerning the air permeability or porosity of the film. In this connection it should be noted that the moisture absorption of a film

**RESPONSE UNDER 37 C.F.R. § 1.116**

U.S. Application No. 10/030,247

**Q68006**

does not always represent the existence of open pores in the film since the moisture absorption can be given by the presence of non-open pores in the surface area of the film.

These distinctions, or deficiencies, in Tamura et al are not remedied by the secondary references to Tsutsumi, JP 59-14494 or Kawakami.

For the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a).

Finally, if the rejection is maintained, Applicants respectfully request that in view of the above comments, the Examiner respond specifically to these comments and provide specific support for the assertion that the film in Tamura would have inherently possessed a porous structure prior to stretching since both Tamura and Applicants assertedly use the inorganic salt in the coagulating bath, and the assertion that the gas permeability, porosity and cross-sectional pore laminar coefficient would also be inherently present.

***Conclusion***

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

**RESPONSE UNDER 37 C.F.R. § 1.116**

U.S. Application No. 10/030,247

**Q68006**

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



John K. Shin  
Registration No. 48,409

SUGHRUE MION, PLLC  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

WASHINGTON OFFICE

**23373**

CUSTOMER NUMBER

Date: November 12, 2003